

BIOCONTROL

PROGRAM PROFILE

| | |
|---|---|
| Goal | To safeguard plant and animal resources from exotic pests and diseases and to protect plant resources by managing pests. |
| Enabling Legislation | 7 USC 147; PL 78-425; Organic Act of 1944. |
| Economic Significance | The Colorado Potato Beetle (CPB) causes millions of dollars in losses per year. The total loss attributed to Russian Wheat Aphid (RWA) exceeds \$1 billion since 1987. Whitefly transmitted diseases have caused staggering losses to desert southwest agriculture in the last 10 years. |
| Principal Approach And Methods Used to Achieve Goals | Program methods include foreign and local field collections, release and redistribution of biocontrol agents, and evaluation. The whitefly program involves identifying strains, identifying whitefly transmitted viruses of crop plants; obtaining natural enemies; and propagating natural enemies at APHIS laboratories and field insectaries. |
| History | The production of beneficial organisms occurred during the following periods for biological control of the cereal leaf beetle 1966-1979, CPB 1985-present, Diffuse and Spotted Knapweed 1985-present, RWA 1986-present, leafy spurge in 1987-present, and SLW 1991-present. |
| State and Local Cooperation | No specific matching requirements, but States provide personnel, field evaluation support, and funding. |
| Involvement of Other Agencies | APHIS applies Agricultural Research Service (ARS) research on crop pests. Program works with the Economic Research Service; the Cooperative State Research Service; Extension Service; industry; EPA; and other international, Federal, or State agencies to develop technologies to manage these pests. |

RESOURCE DATA

-----Obligations-----

| | <u>Direct</u> | <u>Reimbursement</u> | <u>User Fees</u> | <u>Staff-Years</u> |
|----------------|---------------|----------------------|------------------|--------------------|
| FY 1997 | \$8,256,731 | -- | -- | 127 |
| FY 1998 | \$8,166,595 | -- | -- | 132 |
| FY 1999 | \$7,976,975 | -- | -- | 105 |
| FY 2000 (est.) | \$8,153,000 | -- | -- | 105 |
| FY 2001 (est.) | \$8,318,000 | -- | -- | 103 |

| | <u>APHIS</u> | <u>Coop</u> | <u>Total</u> | <u>CCC</u> | <u>Contingency Fund</u> |
|------|---------------|--------------|---------------|------------|-------------------------|
| Cum. | \$107,863,625 | \$32,012,032 | \$139,875,657 | | \$211,444 ^① |

① Includes Pink Hibiscus Mealybug funding in FY-1999.

RECENT ACCOMPLISHMENTS

Brown Citrus Aphid (BCA)

A survey of the BCA indicated that this pest was not found on citrus growing in the Rio Grande Valley of Texas. We will continue and enhance this survey in FY 2000 to protect the citrus industry. Laboratory and field evaluations indicate that hyphomycete pathogenic fungi can be used to biologically control the BCA.

Cereal Leaf Beetle (CLB) Biological Control Project

The Niles Biological Control Laboratory released, recovered, and evaluated CLB agents in FY 1999. We collected over 3,000 parasitized larvae in Montana for release in Nova Scotia and shipped another 2,000 to Oregon. Utah cooperators collected 3,000 parasitized larvae for releases Idaho. The Niles Lab shipped CLB egg parasites, *Anaphes flavipes*, to Georgia, Montana, Utah, Wyoming and Nova Scotia.

Dalmatian Tadflax (DT)

In FY 1999, we released approximately 350 adults of the stem-boring weevil *Mecinus janthinus* against DT in Colorado, Wyoming, and Montana. We also released several hundred adults of the root-galling weevil *Gymnetron linariae* at field locations in Wyoming, South Dakota, and Montana. Additionally, we collected and provided approximately 400 adults of the flower-feeding

beetles *Brachypterolus pulicarius* and *Gymnetron antirrhini* to cooperators in Montana and Wyoming. Finally, we continued propagation of the Bozeman Lab colony of the leaf-feeding moth *Calophasia lunula*.

Japanese Beetle (JB)

JB continues to be a regulatory problem at many eastern commercial airports and military air bases. Using entomopathogens against adult beetles and developing grub populations offers a unique method of control. We conducted a replicated field test at Dover AFB in Delaware to test the feasibility of this technique, which we hope will reduce regulatory problems at airports.

Leafy Spurge (LS)

Biological control may ultimately control 60-70 percent of the LS in the U.S., with an economic benefit of \$60 million annually. In FY 1999, APHIS collaborated with ARS in the "Team Leafy Spurge" Areawide Demonstration Project in Montana, North Dakota, South Dakota, and Wyoming. APHIS released agents in over 200 counties in 19 states, with establishment rates exceeding 80 percent. Several species of *Aphthona* flea beetles are the most widely distributed agents. When established, they can cause 90 percent reductions in weed density. The Team collected, redistributed, and released 20.5 million *Aphthona* flea beetles in 55 counties in the demonstration area. APHIS' distribution program ensures that agents are well established in LS-infested regions of the U.S. With technical assistance from APHIS, State and local cooperators will conduct future distributions.

National Biological Control Institute (NBCI)

In FY 1999, NBCI facilitated, implemented, and promoted partnership cooperation in biological control by: 1) conducting a competitive cooperative agreements and grants program to implement actions of importance to pest management, 2) facilitating international/off-shore biological control programs to safeguard American agriculture and the environment, 3) coordinating communication within the biological control community, and 4) integrating biological control to mitigate the devastating impact of invasive species in the US. This helped ensure that the biological control community worked on common goals, supported interdisciplinary studies, and promoted long-term monitoring and program evaluation.

Also, NBCI supported biological control projects through three competitive Cooperative Agreement and Grant Programs. We established partnerships with State and local governments, universities, non-profit institutions, and Federal agencies. NBCI conducted programs on the following: Asian longhorned beetle, brown citrus aphid, Dalmatian and yellow toadflax, giant salvinia, gypsy moth, imported fire ant, Mediterranean fruit fly, pink hibiscus mealybug, purple loosestrife, saltcedar, and silverleaf whitefly. We supported 36 projects in FY 1999, totaling \$472,054.

Purple Loosestrife (PLS)

In FY 1999, PLS control activities focused on mass rearing and distributing the leaf feeding beetle *Galerucella californiensis* and establishing a laboratory colony of the root boring weevil *Hylobius transversovittatus*. The Niles Laboratory assisted the Mission Laboratory in mass rearing the leaf feeding beetle and shipped them to the following 19 States: Connecticut, Delaware, Indiana, Iowa, Kansas, Maine, Maryland, Michigan, Missouri, Nebraska, New Hampshire, North Dakota, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia and Wisconsin. A new program direction is the mass rearing/release of *Hylobius*. In FY 1999, we made two releases of adult *Hylobius* weevils in Nebraska and Connecticut. We will employ an artificial diet for the *Hylobius* rearing process in FY 2000, accelerating its distribution and establishment. We released a third natural enemy, *Nanophyes marmoratus*, a seed head weevil of PLS flower spikes, in Colorado, Connecticut, Delaware, Iowa, and Nebraska. Widespread distribution and establishment of these natural enemies should help to control invasive purple loosestrife on natural wetland areas.

Russian Knapweed (RKW)

In FY 1999, cooperative work focused on foreign exploration for natural enemies of RKW in western Asia. The collection of molecular genetics data of U.S. and foreign sources of the plant is unique to this program. This will allow the matching of natural enemy introductions to similar plant populations at release sites in the U.S. This approach should enhance the rate of natural enemy establishment while speeding program success. We are

currently testing ten promising biological control agents to determine their suitability for release in North America.

Silverleaf Whitefly (SLW)

In FY 1999, the Mission Plant Protection Center maintained and mass-reared seven non-indigenous parasitoids of SLW for field release. We employed both classical and augmentative biological control release strategies in this national program. Also, we supplied approximately 4 million *Eretmocerus* parasitoids to collaborators in Arizona, California, Puerto Rico, South Carolina, and Texas for classical biological control and to evaluate augmentative releases. We also supplied *Encarsia formosa* and *Serangium parcesetosum* to support greenhouse evaluations for controlling SLW on poinsettia in Connecticut and New Hampshire. A rapid identification process, RAPD-PCR, helped the program identify SLW parasitoids precisely, cost efficiently, and rapidly. We also progressed with the development of a DNA/ELISA kit to identify parasitoids in laboratory and field situations.

Spotted and Diffuse Knapweed (SDK)

APHIS' Bozeman Plant Protection Station supplied research-based technical support for the biological control of SDK to APHIS State Plant Health Directors and their cooperators. The station also monitored field releases of natural enemies and tracked population development and spread. Additionally, Bozeman Station published results of knapweed studies, insect releases, and recoveries; developed public presentations and literature; and advised State cooperators on technical transfer and management issues of SDK insectaries.